

## § 431.86

## 10 CFR Ch. II (1–1–14 Edition)

(“HI BTS–2000, Rev 06.07”), *Method to Determine Efficiency of Commercial Space Heating Boilers*, Second Edition (Rev 06.07), 2007, IBR approved for § 431.86.

(2) [Reserved]

[74 FR 36354, July 22, 2009]

### § 431.86 Uniform test method for the measurement of energy efficiency of commercial packaged boilers.

(a) *Scope.* This section provides test procedures that must be followed for measuring, pursuant to EPCA, the steady state combustion efficiency and thermal efficiency of a gas-fired or oil-fired commercial packaged boiler. These test procedures apply to packaged low pressure boilers that have rated input capacities of 300,000 Btu/h or more and are “commercial packaged boilers,” but do not apply under EPCA to “packaged high pressure boilers.”

(b) *Definitions.* For purposes of this section, the Department incorporates by reference the definitions specified in Section 3.0 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85), with the exception of the definition for the terms “packaged boiler,” “condensing boilers,” and “packaged low pressure steam” and “hot water boiler.”

(c) *Test Method for Commercial Packaged Boilers—General.* Follow the provisions in this paragraph (c) for all testing of packaged low pressure boilers that are commercial packaged boilers.

(1) *Test Setup—(i) Classifications:* If employing boiler classification, you must classify boilers as given in Section 4.0 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85).

(ii) *Requirements:* (A) Before March 2, 2012, conduct the combustion efficiency test as given in Section 5.2 (Combustion Efficiency Test) of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85) for all commercial packaged boiler equipment classes.

(B) On or after March 2, 2012, conduct the thermal efficiency test as given in Section 5.1 (Thermal Efficiency Test) of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85) for the following commercial packaged boiler equipment classes: Small, gas, hot water; small, gas, steam, all except natural draft; small, gas, steam, natural draft; small, oil, hot water; small,

oil, steam; large, gas, steam, all except natural draft; large, gas, steam, natural draft; and large, oil, steam. On or after March 2, 2012, conduct the combustion efficiency test as given in Section 5.2 (Combustion Efficiency Test) of the HI BTS–2000, Rev 06.07 for the following commercial packaged boiler equipment classes: Large, gas-fired, hot water and large, oil-fired, hot water.

(iii) *Instruments and Apparatus:* (A) Follow the requirements for instruments and apparatus in sections 6 (Instruments) and 7 (Apparatus), of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85), with the exception of section 7.2.5 (flue connection for outdoor boilers) which is replaced with paragraph (c)(1)(iii)(B) of this section:

(B) *Flue Connection for Outdoor Boilers:* Consistent with the procedure specified in section 7.2.1 of HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85), the integral venting used in oil-fired and power gas outdoor boilers may be modified only to the extent necessary to permit the boiler’s connection to the test flue apparatus for testing.

(iv) *Test Conditions:* Use test conditions from Section 8.0 (excluding 8.6.2) of HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85) for combustion efficiency testing. Use all of the test conditions from Section 8.0 of HI BTS–2000, Rev 06.07 for thermal efficiency testing.

(2) *Test Measurements—(i) Non-Condensing Boilers:* (A) *Combustion Efficiency.* Measure for combustion efficiency according to sections 9.1 (excluding sections 9.1.1.2.3 and 9.1.2.2.3), 9.2 and 10.2 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85).

(B) *Thermal Efficiency.* Measure for thermal efficiency according to sections 9.1 and 10.1 of the HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85).

(ii) *Procedure for the Measurement of Condensate for a Condensing Boiler.* For the combustion efficiency test, collect flue condensate as specified in Section 9.2.2 of HI BTS–2000, Rev 06.07 (incorporated by reference, see § 431.85). Measure the condensate from the flue gas under steady state operation for the 30 minute collection period during

## Department of Energy

## § 431.87

the 30 minute steady state combustion efficiency test. Flue condensate mass shall be measured immediately at the end of the 30 minute collection period to prevent evaporation loss from the sample. The humidity of the room shall at no time exceed 80 percent. Determine the mass of flue condensate for the steady state period by subtracting the tare container weight from the total container and flue condensate weight measured at the end of the test period. For the thermal efficiency test, collect and measure the condensate from the flue gas as specified in Section 9.1.1 and 9.1.2 of HI BTS-2000, Rev 06.07.

(iii) *A Boiler That is Capable of Supplying Either Steam or Hot Water—(A) Testing.* For purposes of EPCA, before March 2, 2012, measure the combustion efficiency of any size commercial packaged boiler capable of supplying either steam or hot water either by testing the boiler in the steam mode or by testing it in both the steam and hot water modes. On or after March 2, 2012, measure the combustion efficiency and thermal efficiency of a large (fuel input greater than 2,500 kBtu/h) commercial packaged boiler capable of supplying either steam or hot water either by testing the boiler for both efficiencies in steam mode, or by testing the boiler in both steam and hot water modes measuring the thermal efficiency of the boiler in steam mode and the combustion efficiency of the boiler in hot water mode. Measure only the thermal efficiency of a small (fuel input of greater than or equal to 300 kBtu/h and less than or equal to 2,500 kBtu/h) commercial packaged boiler capable of supplying either steam or hot water either by testing the boiler for thermal efficiency only in steam mode or by testing the boiler for thermal efficiency in both steam and hot water modes.

(B) *Rating.* If testing a large boiler only in the steam mode, use the efficiencies determined from such testing to rate the thermal efficiency for the steam mode and the combustion effi-

ciency for the hot water mode. If testing a large boiler in both modes, rate the boiler's efficiency for each mode based on the testing in that mode. If testing a small boiler only in the steam mode, use the efficiencies determined from such testing to rate the thermal efficiency for the steam mode and the hot water mode. If testing a small boiler in both modes, rate the boiler's efficiency for each mode based on the testing in that mode.

(3) *Calculation of Efficiency—(i) Combustion Efficiency.* Use the calculation procedure for the combustion efficiency test specified in Section 11.2 (including the specified subsections of 11.1) of the HI BTS-2000, Rev 06.07 (incorporated by reference, see § 431.85).

(ii) *Thermal Efficiency.* Use the calculation procedure for the thermal efficiency test specified in Section 11.1 of the HI BTS-2000, Rev 06.07 (incorporated by reference, see § 431.85).

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### ENERGY EFFICIENCY STANDARDS

#### § 431.87 Energy conservation standards and their effective dates.

(a) Each commercial packaged boiler manufactured on or after January 1, 1994, and before March 2, 2012, must meet the following energy efficiency standard levels:

(1) For a gas-fired packaged boiler with a capacity (rated maximum input) of 300,000 Btu/h or more, the combustion efficiency at the maximum rated capacity must be not less than 80 percent.

(2) For an oil-fired packaged boiler with a capacity (rated maximum input) of 300,000 Btu/h or more, the combustion efficiency at the maximum rated capacity must be not less than 83 percent.

(b) Each commercial packaged boiler listed in Table 1 to § 431.87 and manufactured on or after the effective date listed in Table 1 of this section, must meet the applicable energy conservation standard in Table 1.